

VIVID VOLUME

Practice Exercises - Volume

(From Bassarear, T. (2008). *Mathematics for Elementary School Teachers*. Houghton Mifflin: Boston. Chapter 10.)

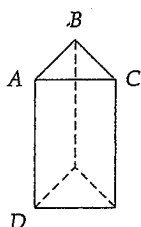
BASIC

1. Determine the surface area and volume of each of the following:

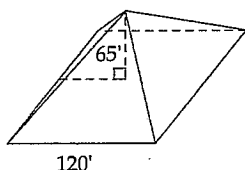
- a. $\angle ABC$ is a right angle.

$AB = 10$ inches, $BC = 12$ inches

$AD = 3$ feet



- b. The base is a square.



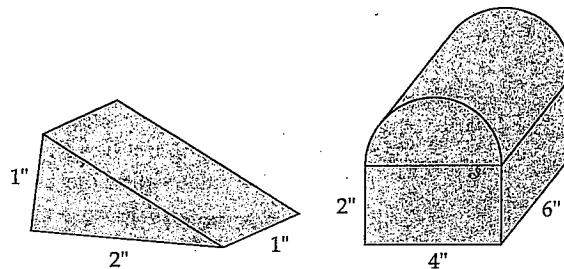
- c. The diameter is 5 feet 6 inches.
The height is 11 feet 3 inches.



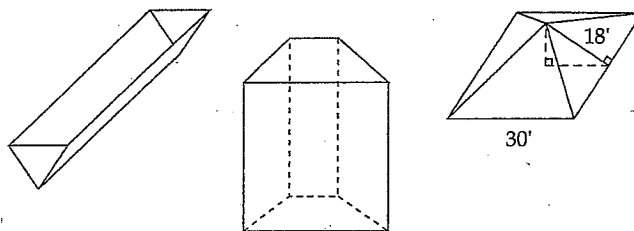
2. Find the missing numbers for the dimensions and measures of a rectangular prism.

	Length	Width	Height	Surface area	Volume
a.	10 m	5 m			900 m^3
b.		7 m	5 m	214 m^2	
c.	5 m			94 m^2	60 m^3
d.		2.5 m	4.6 m		172.5 m^3

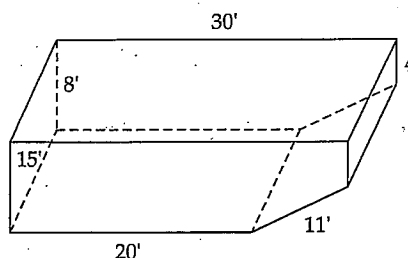
3. a. If a sphere has a radius of 6 inches, what is its surface area? volume?
b. If a cylinder has a height of 12 feet and a radius of 2 feet, what is its surface area? volume?
c. If a cylinder has a volume of 400 m^3 and a radius of 5 m, what is its height?
4. a. Look at the triangular prism shown at the top of the right column. If you were to make a net for this polyhedron, what would be the dimensions of the ramp?
b. Look at the figure at the far right at the top of the right column. If you were to make a net for this polyhedron, what would be the exact dimensions of the "roof"?



5. a. Determine the surface area and volume of the watering trough shown below. The length of the trough is 16 feet, each of the two ends of the trough is an isosceles triangle whose base is 2 feet, and the height is 1 foot.
b. Determine the surface area of the inside of the room in the center below and the volume of the room. The base of the room is in the shape of an isosceles trapezoid. The longer base is 12 feet 4 inches, and the shorter base is 8 feet 9 inches. Both slant sides are 13 feet. The height of the room is 9 feet.
c. The base of the pyramid at the right below is a square. The slant height of the pyramid is 18 feet. Determine the surface area and volume.



6. a. Determine the surface area and volume of the swimming pool below.
b. Determine how many gallons of water the pool will hold.



7. The dimensions of a cereal box are $b = 6$ inches, $h = 12$ inches and $w = 2$ inches.
a. Determine its volume and surface area.
b. Keeping the dimensions as whole numbers, modify the dimensions (but keep them as integers) to keep the volume the same but decrease the surface area and thus the amount of packaging.
c. What is the maximum volume you can get with the same surface area in part a?

VIVID VOLUME

Practice Exercises - Volume

(From Bassarear, T. (2008). *Mathematics for Elementary School Teachers*. Houghton Mifflin: Boston. Chapter 10.)

8. Imagine a piece of square paper that measures 20 by 20 cm. You can make a box (with no lid) by cutting a square of the same size from each corner and folding up what's left to make a box. Keeping the lengths of each sides integers, what is the maximum volume box that can be made?
9. A regular sheet of paper ($8\frac{1}{2}$ inches by 11 inches) can be rolled into a cylinder in two different ways. Which of these cylinders has the greater volume?
10.
 - a. How many boxes that are 1 foot by 1 foot by 1 foot could you fit into your classroom?
 - b. How many boxes that are 6 inches by 6 inches by 6 inches could you fit into your classroom?
 - c. How many boxes of cereal could you fit into your classroom?
11. Each edge of the cube is 20 feet. Calculate the distance from point A to point D on these paths.
 - a. From vertex A to vertex B to vertex C to vertex D
 - b. From vertex A to a point X halfway between vertex B and C, then from that point to vertex D
 - c. A straight line from vertex A to vertex D
12. Let's say a national disaster (hurricane, tornado, ice storm, or earthquake) has struck your area and thousands of people have been made homeless. The National Guard has a large supply of cots, measuring 2 feet by 6 feet.
 - a. Let's say the National Guard has tents that measure 20 feet by 25 feet. How many cots could they reasonably get in each tent?
 - b. Let's say the gym in a high school measures 120 feet by 80 feet and has two entrances. How many cots could they reasonably get in the gym?

